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PALEOHYDROLOGY OF LAKE SELIGER (VALDAI UPLAND, RUSSIA)

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Lake Seliger is located on the Valdai Upland, the main watershed of the East European Plain, which divides the river runoff between the basins of the Caspian and Baltic Seas. The Valdai Upland is in the margin zone of the last glaciation. This area has a typical post-glacial landscape with marginal moraines, kamas, eskers and kettle holes. The Valdai Upland gave the name to the last glacial epoch in the Russian geological systematic - the Valdai glaciation. Traditionally, the Lake Seliger is considered relict lake (Kvasov, 1976), which remained after degradation of a huge proglacial lake.

Lake Seliger is a system of 24 semi-isolated bays (so-called Ples), which stretch for 60 km from north to south. The lake has an area of 212 sq km (The State Water Register.., 2008), an average depth of 5 m, and a maximum of 24 m. The length of its very winding coastline is 528 km. In the lake there are more than 160 islands, the largest of which is the island Khachin. In Lake Seliger, there are 110 inflows. The largest inflows are the rivers Krapivenka, Soroga and Seremuha. The catchment area is 2310 sq km. The river Selizharovka flows out from Lake Seliger. It is the left inflow of the Volga River.

Sediments of the lake Seliger were studied in the 1930s in the exploration of deposits of sapropel (Soloviev, 1934), which was used as an organic fertilizer. In 1960s a lot of boreholes were drilled in the bottom sediments of the lake in search of sand and gravel, which was supposed to be used for construction needs (Savary, 1963). As a paleoarchive, the bottom sediments of Lake Seliger have not been studied before.

In winter of 2018, the bottom sediments of Lake Seliger were drilled from ice. Drilling was carried out on 5 profiles in the southern part of the lake. A modified piston corer of Livingston (Wright, 1967) was used. In total, 14 borehols were drilled. Received and delivered to the laboratory 43 m of cores. For samples from reference cores, the loss on ignition and the particle size distribution were determined. 15 samples of organic matter were submitted to the radiocarbon laboratory of the Institute of Geography of the Russian Academy of Sciences.

In all boreholes at the bottom of the lake, 2-3-meter, and in some cases 6-meter lake mud, have been discovered. The upper part of the mud has a dark gray color due to enrichment with organic matter (30-60%). This is the Holocene sapropel (gyttja). The lower layers of mud in many boreholes have a light gray or blue-gray color, because they contain little organic matter (3-10%). This is a sign of formation in a cold climate - at the end of the last glacial epoch. Everywhere under the mud coarse sands occur. It is deposits of a fairly fast water flow.

There is reason to believe that the sands lying in the lower part of the sections are deposits of river flows, but not glacial melt-water deposits. Firstly, on a narrow and sinuous Selizharovo Ples, a transverse profile along top of sands has triangular shape. It is typical for a meandering river: at the concave

bank of the river - deep, near the convex - shallow, there is a beach. Secondly, here and on other sites in the surface of the sand there are two steps. It is similar to the bottom of the riverbed and the flood plain. Third, at the bottom of the mud on the former floodplain, features similar to buried soils are encountered. And peat layers are encountered in two places. This indicates a long period of subaerial development (i.e., in the open air, not under water), which would not be possible if the large proglacial lake is simply drying up.

Thus, after the melting of the glacier in the place of Seliger the river flowed, apparently inheriting the ancient (before glaciation) river valley. Then, for unknown reasons, the flow stopped and the valley was flooded. On the sites studied, the water level rose by 5-8 meters. The reasons for this phenomenon remain to be determined.

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PRELIMINARY RESULTS OF POLLEN STUDY FROM LAKE IMANDRA SEDIMENTS

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The Arctic landscapes are highly sensitive to climate variations. Therefore, it is an important region for understanding present and past climate changes. Lake sediments are a good source of information for studying permanent environmental changes. Territory of Lake Imandra was covered by Arctic Ice Sheet during the Late Pleistocene. Studying lake sediments on this polygon can help in the reconstruction of lateglacial and postglacial conditions. Pollen analysis provides information about local and regional vegetation climate changes.

The two cores of bottom sediments were collected during joint field campaign of the Saint-Petersburg State University, Kola science centre and University of Cologne in September of 2017. The total trickiness of core is about 8.5 m. At the present time the samples from corecatchers have studied by pollen analysis. The 26 samples with variable interval (from 2-5 cm to 50 cm) were analyzed. The 58 pollen, spores and non pollen palynomorph taxa were indentified.

Three pollen zones were distinguished according to changes in pollen spectra. The first zone (PZ-1) from 8.5 m to 7.0 m shows low concentrations of microfossils. The single grains of *Betula nana*, Cyperaceae, Chenopodiaceae, Ericaceae, Polypodiaceae, *Sphagnum* and *Lycopodium* taxa were indentified. Such low concentration may indicate cold and dry conditions. The second zone (PZ-2) from 7.0 m to 4.7 m shows domination of trees and shrub pollen taxa (65%). *Betula nana* is prevailed in this group. The herbs pollen taxa are presented by *Artemisia*, Chenopodiaceae, Ericaceae, Cyperaceae and Poaceae. The single grain of *Ephedra* pollen was identified in this zone.